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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TIZIANO TANAGLIA, AROLDO BIGGI,
ORSOLA CASABURO, LISA BIGGI, and FRANCESCO MASI

Appeal 2009-012431
Application 10/507,218
Technology Center 1700

Decided: June 28, 2010

Before CHARLES F. WARREN, CATHERINE Q. TIMM, and
STEPHEN WALSH, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

I. STATEMENT OF CASE

Appellants appeal under 35 U.S.C. § 134 from the Examiner's decision to reject claims 1-12 and 15-17 under 35 U.S.C § 103(a) as unpatentable over Tse (US 2003/0013623 A1; published Jan. 16, 2003) in

view of Foulger (US 6,569,937 B2; issued May 27, 2003).¹ We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

Appellants' invention relates to a process for functionalizing polyolefins using at least one hydroperoxide under high shear conditions. The process reduces the crosslinking phenomena of the polyolefins and avoids increases in molecular weight and the formation of microgels and branchings that affect processability of the end product. (Spec. 3: 3-10.) Claims 1 and 4 are illustrative:

1. A process for the functionalisation of polyolefins selected from the group consisting of:

- ethylene/propylene copolymers (EPM) with a molar propylene content ranging from 16% to 50%, and an Mw ranging from 10,000 to 200,000; and

- ethylene/propylene/non-conjugated diolefin (EPDM) terpolymers with a molar ethylene content ranging from 40 to 85%, from 15 to 70% of propylene and 2 to 10% molar of non-conjugated diene, the molecular weights Mw of the EPDM being within the range from 75,000 to 450,000;

which comprises the treatment under shear conditions higher than 100 sec^{-1} , with a polar unsaturated monomer selected from the group consisting of maleic anhydride and its esters, amides, acid and metallic salt, in the presence of at least one hydroperoxide as radicalic initiator, the concentration of hydroperoxide with respect to the polyolefins ranging from 0.1 to 20% by weight.

¹ The Examiner has withdrawn the provisional non-statutory obviousness-type double patenting rejections of claims 1-17 and the separate obviousness rejection of claims 1, 3-9, 11, 12, and 15-17. With these withdrawals, currently pending claims 13 and 14 no longer stand rejected.

4. The process according to claim 1, wherein the ethylene/propylene/non-conjugated diolefin (EPDM) terpolymers are present and have a molar ethylene content ranging from 40 to 70%, from 30 to 60% of propylene and from 0.5 to 20% of non-conjugated diene.

Appellants address all the rejected claims as a group and provide arguments under a separate heading particularly for dependent claims 4-9 (Br. 6-8). Accordingly, we first address independent claim 1 as representative of the entire group and then dependent claim 4 as representative of the group separately argued.

II. CLAIM 1

A. ISSUE ON APPEAL

A first issue on appeal arising from the contentions of Appellants and the Examiner is: does the evidence of unexpected results provided by Appellants in Appellants' Specification, when all the evidence is weighed anew, support a conclusion of non-obviousness? We answer this question in the negative.

B. PRINCIPLES OF LAW

"The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007). The question to be asked is "whether the improvement is more than the predictable use of prior art elements according to their established functions." *KSR*, 550 U.S. at 417.

A patent applicant can rebut a *prima facie* case of obviousness by showing "unexpected results," *i.e.*, showing that the claimed invention possesses a superior property or advantage that a person of ordinary skill in

the art would have found surprising or unexpected. See *In re Geisler*, 116 F.3d 1465, 1469 (Fed. Cir. 1997) (quoting *In re Soni*, 54 F.3d 746, 750 (Fed. Cir. 1995)). “[W]hen unexpected results are used as evidence of nonobviousness, the results must be shown to be unexpected compared with the closest prior art.” *In re Baxter Travenol Labs.*, 952 F.2d 388, 392 (Fed. Cir. 1991). Additionally, the evidence of unexpected results must be commensurate in scope with the claimed subject matter. See, e.g., *In re Harris*, 409 F.3d 1339, 1344 (Fed. Cir. 2005) (“Even assuming that the results were unexpected, Harris needed to show results covering the scope of the claimed range. Alternatively Harris needed to narrow the claims.”); *In re Greenfield*, 571 F.2d 1185, 1189 (CCPA 1978) (“Establishing that one (or a small number of) species gives unexpected results is inadequate proof, for ‘it is the view of this court that objective evidence of non-obviousness must be commensurate in scope with the claims which the evidence is offered to support.’”) (quoting *In re Tiffin*, 448 F.2d 791, 792 (CCPA 1971)).

C. DISCUSSION

We adopt the Examiner’s findings in the Answer as our own and add the additional findings of fact appearing below for emphasis.

Appellants contend that the claimed functionalization process using hydroperoxide and a high shear rate produces unexpected results, as evidenced by Table 1 of Appellants’ Specification, that would not be appreciated by one of ordinary skill in the art based on Tse, which makes no distinction between peroxides and hydroperoxides, fails to use hydroperoxides in any of the examples, and fails to recite any shear conditions (Br. 5-7).

We agree with the Examiner that Appellants' Specification is unpersuasive as evidence of unexpected results (Ans. 6-7). Appellants' Specification provides no evidence of criticality as to a shear rate of "higher than 100 sec^{-1} ," as recited in claim 1. Appellants' Example 1, which Appellants characterize as "according to the invention" (Br. 5), and comparative Example 4, which Appellants characterize as employing "low shear conditions" (Br. 5), only disclose a mixer volume and a rotation rate in RPMs (Spec. 9:23-10:1). Appellants have failed to explain how this information can be converted into a shear rate in sec^{-1} in order to compare the shear rate of the examples to the shear rate recited in claim 1. Moreover, even if Example 1 discloses a shear rate within the range of "higher than 100 sec^{-1} ," the single shear rate data point is not sufficient to establish that the shear rate is critical over the entire claimed range.

Additionally, we find it of no moment that Tse discloses the use of maleic anhydride as a "decomposition promoter" and not a functionalizing agent (*see* Br. 7). A different disclosed purpose for using the maleic anhydride in the disclosed process is not persuasive of non-obviousness since "any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *KSR*, 550 US at 420. Moreover, Tse includes an additional teaching of the use of maleic anhydride as a grafting material for an ethylene alpha-olefin copolymer (Tse, ¶ [0158]). Thus, one of ordinary skill in the art would have recognized the use of maleic anhydride as a functionalization agent.

III. CLAIM 4

A. ISSUE ON APPEAL

Claims 4-9 are particularly limited to embodiments in which EPDM copolymers are functionalized. Appellants contend that Tse does not suggest the functionalization of EPDM copolymers under the claimed conditions, since Tse makes no distinction between EPM and EPDM copolymers, which have different olefinic saturation groups, and since all examples in Tse are directed to EPM copolymers (Br. 7-8).

Thus, an issue on appeal arising from the contentions of Appellants and the Examiner is: does the evidence support the Appellants' view that the Examiner erred in concluding that it would have been obvious for one of ordinary skill in the art to functionalize EPDM using the process recited in claim 45 based on the teachings of Tse? We answer this question the negative.

B. ANALYSIS

We agree with the Examiner that the teachings of Tse embrace the use of EPDM copolymers as an alternative to the EPM copolymers used in the examples (Ans. 5; Tse, ¶¶ [0046]-[0051]). Tse's disclosure of non-conjugated dienes (Tse, ¶¶ [0046]-[0051]) includes non-conjugated dienes listed in Appellants' description of EPDM (Spec. 4:2-5). A reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill in the art, including non-preferred embodiments. *Merck & Co v. Biocraft Labs.*, 874 F.2d 804, 807 (Fed. Cir. 1989). Disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or non-preferred embodiments. *In re Susi*, 440 F.2d 442, 446 n.3

(CCPA 1971). One of ordinary skill in the art would have understood that the process could be applied to EPDM.

IV. CONCLUSION

On the record before us² and for the reasons discussed above, we sustain the rejection maintained by the Examiner.

V. DECISION

We affirm the Examiner's decision.

VI. TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

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² Only those arguments actually made by Appellants have been considered in this decision. Arguments which Appellants could have made but chose not to make have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii) (2008).